Energy

What is ENERGY?

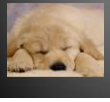
- Energy is the ability to do work.
- Everything that happens in the world uses energy!
- Most of the time we can't see energy, but it is everywhere around us!

Energy…

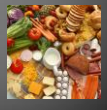
- is NEVER created or destroyed!
- can only be STORED or TRANFERRED.

Batteries store energy!

This car uses a lot of energy



Even this sleeping puppy is using stored energy.

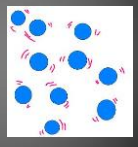


We get our energy from FOOD!

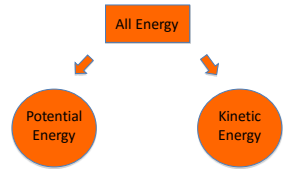
Remember:

ALL matter is made up of particles.

The particles NEVER stop moving.



How is all energy divided?



Energy

- In these two types, there are many different forms of energy:
- –Chemical, mechanical, sound, heat, light, electrical, nuclear, gravitational

Potential Energy is…

- The energy stored in an object.
- "Potential" simply means the energy has the ability to do something useful later on.

Figure 4. Examples of spring energy

Examples of Potential Energy:

A stretched rubber band..

Water at the top of a waterfall..

Yo-Yo held in your hand..

A drawn Bow and Arrow…

Examples:


- The higher an object, the more potential energy.
- The more mass an object has, the more potential energy it has.

Which object has more potential energy?


ANSWER

This brick has more mass than the feather; therefore more potential energy!

CHANGING AN OBJECTS' HEIGHT CAN CHANGE ITS POTENTIAL ENERGY.

- If I want to drop an apple from the top of one of these three things, where will be the most potential energy?

ANSWER

- The higher the object, the more potential energy!

Pretest

- http://studyjams.scholastic.com/studyjams/jams/science/forces-and-motion/force-and-motion.htm

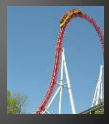
3/30/2016

Potential Energy Converted to Kinetic Energy…

- When stored energy begins to move, the object now transfers from potential energy into kinetic energy.

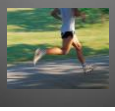

Kinetic Energy Is…

- The energy of a moving object.
- "Kinetic" means movement!
- When stored energy is being used up, it is making things move or happen.

Examples of Kinetic Energy:



- The faster the object moves, the more kinetic energy is produced.

- The greater the mass and speed of an object, the more kinetic energy there will be.

When these objects move at the same speed, which will have more kinetic energy?

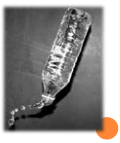

ANSWER

The semi- truck has more mass; therefore, more kinetic energy!

- An object has the MOST kinetic energy when it's movement is the GREATEST.
- When an object has the LEAST potential energy, it has the MOST kinetic energy.

A water bottle is knocked off a desk. When does the bottle have the MOST kinetic energy?

A. At the top of the fall.
B. In the middle of the fall.
C. At the bottom of the fall.



- C. At the bottom of the fall.
- It has the most kinetic energy when its movement and speed are greatest, which is at the bottom of the fall right before it hits the ground.
- When an object has the LEAST potential energy is when it has the MOST kinetic energy.
- Study Jams

Roller Coasters

- When does the train on this roller coaster have the MOST potential energy?
- AT THE VERY TOP!
- The HIGHER the train is lifted by the motor, the MORE potential energy is produced.
- At the top of the hill the train has a huge amount of potential energy, but it has very little kinetic energy.

- As the train accelerates down the hill the potential energy is converted into kinetic energy.
- There is very little potential energy at the bottom of the hill, but there is a great amount of kinetic energy.

- When does the train on this roller coaster have the MOST kinetic energy?

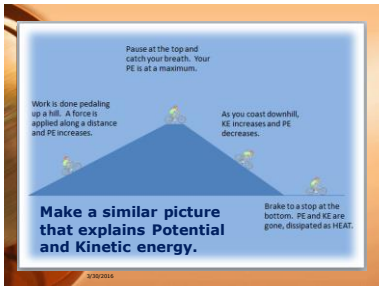
(When is it moving the fastest?)

(When does it have the LEAST potential energy???)

- At the bottom of the tallest hill!

Review

- All energy is divided into two types: potential and kinetic.
- **Potential Energy:** The energy stored in an object.
- **Kinetic Energy:** The energy of a moving object.
- Energy is never created or destroyed. It is always stored or transferred.



Potential or Kinetic?

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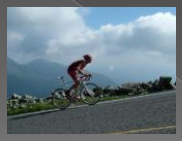


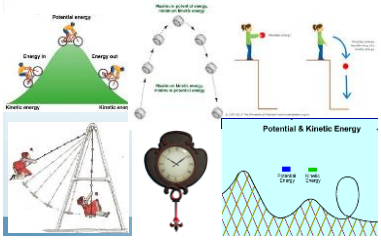
Picture yourself riding a bike up a hill, resting for a bit, and then coasting down the other side. As you Work to get up the hill, you gain potential energy. As you coast down the other side, that potential energy is converted to kinetic energy.

1. **What factors affect an object's kinetic energy? An object's mass and velocity affect its kinetic energy.**
2. **At a given height above Earth, how would you determine the potential energy of a sky diver? The kinetic energy of a sky diver? You would need to know the sky diver's weight, height above Earth's surface, mass, and velocity. Potential energy = weight × height above Earth's surface; kinetic energy = 1/2 × mass × velocity²**
3. **What type of energy does a bow have when you pull back an arrow? Elastic potential energy**
4. **What is the value of the number 10^2?**
5. **What number when squared gives you the value 36?**

Sound from this marching band is caused by vibrations of air particles

A law that states that energy cannot be created or destroyed but can change forms

Other things that show PE & KE



Energy

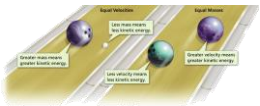
Kinetic energy is the energy of motion.

Potential pnergy is stored energy.

Energy - What Is Energy?

Kinetic Energy

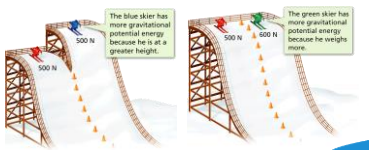
Kinetic energy increases as mass and velocity increases.



Energy - What Is Energy?

Potential Energy

Gravitational potential energy increases as weight and height increase.



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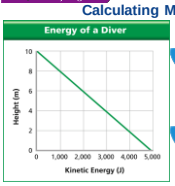
Energy - Forms of Energy

Math Analyzing Data

Calculating Mechanical Energy

Energy of a Diver



Reading Graphs:

Q. According to the graph, how much kinetic energy does the diver have at 8 m?

A. About 1000 J

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Energy

Gravitational Potential Energy

$P.E. = m \times g \times h$

m : mass
g : Gravitational Acceleration (9.8 m/s)
h : Height

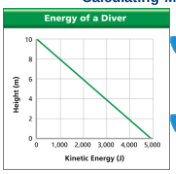
Kinetic Energy = $\frac{1}{2} m v^2$

J — kg — m/s

Energy - Forms of Energy

Math Analyzing Data

Calculating Mechanical Energy



Calculating:

Q. Using the graph, find the kinetic energy of the diver at 6 m. Then calculate the diver's potential energy at that point.

A. Kinetic energy = about 2000 J; potential energy = about 3000 J

Total KE=5000J. At 6 min KE=2000, so PE=5000-2000=3000J

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Energy - Energy Transformations and Conservation

Energy Transformations

Most forms of energy can be transformed into other forms.

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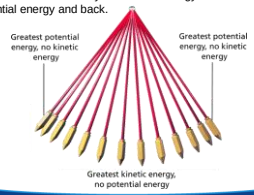
Energy - Energy Transformations and Conservation

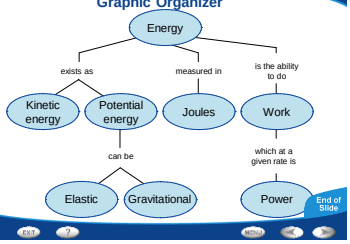
Transformations Between Potential and Kinetic Energy

A pendulum continuously transforms energy from kinetic to potential energy and back.



Energy

Graphic Organizer



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